

**CLAIMS**

1. A method of treating an exhaust gas of a lean-burn reciprocating engine containing  $\text{NO}_x$ , which method comprising sorbing said  $\text{NO}_x$  on at least one  $\text{NO}_x$  sorber  
5 (30) when the exhaust gas is lean, intermittently contacting the at least one  $\text{NO}_x$  sorber with an agent effective to convert  $\text{NO}_x$  to  $\text{N}_2$  thereby to regenerate the at least one  $\text{NO}_x$  sorber and feeding effluent of said intermittent contacting step to the engine inlet (14).
2. A method according to claim 1, comprising simultaneously contacting the lean  
10 exhaust gas with at least two  $\text{NO}_x$  sorbers (30A, 30B) arranged in parallel and intermittently contacting fewer than all of the  $\text{NO}_x$  sorbers simultaneously with said agent.
3. A method according to claim 2, wherein the gas flow in the or each  $\text{NO}_x$  sorber  
15 being regenerated is less than in the or each  $\text{NO}_x$  sorber not being regenerated and substantially the whole of the effluent of the or each  $\text{NO}_x$  sorber(s) being regenerated is fed to the engine inlet.
4. A method according to claim 1, 2 or 3, wherein the agent is a non-selective  
20 reductant such as hydrocarbon (HC), CO or hydrogen.
5. A method according to claim 4, wherein the agent is engine fuel.
6. A method according to claim 1, 2 or 3, wherein the agent is a nitrogen hydride.  
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7. A method according to any preceding claim, comprising catalytic oxidation (22)  
of HC and CO to steam ( $\text{H}_2\text{O}_{(\text{g})}$ ),  $\text{CO}_2$  and/or of NO to  $\text{NO}_2$  upstream of the or each  $\text{NO}_x$  sorber.
- 30 8. A method according to claim 7, comprising particulate matter (PM) collection (24) between NO oxidation and  $\text{NO}_x$  sorption.

9. A lean-burn reciprocating engine (10) emitting exhaust gas containing NO<sub>x</sub> and having a treatment system (19) comprising at least one NO<sub>x</sub> sorber (30) for sorbing NO<sub>x</sub> when the exhaust gas is lean, means (32) for intermittently contacting the at least one NO<sub>x</sub> sorber with an agent effective to convert NO<sub>x</sub> to N<sub>2</sub> thereby to regenerate the at least one NO<sub>x</sub> sorber and means for feeding effluent of said contacting to the engine inlet (14).

10. An engine according to claim 9, comprising exhaust gas recirculation (EGR) means (28, 34, 16) for use in normal or occasional modes of operation, which EGR means optionally comprising a pump.

11. An engine according to claim 9 or 10, comprising at least two NO<sub>x</sub> sorbers (30A, 30B) arranged in parallel, and means for selectively contacting fewer than all of the at least two NO<sub>x</sub> sorbers with the agent.

12. An engine according to claim 11, comprising means for reducing the gas flow to the at least one NO<sub>x</sub> sorber during regeneration of that at least one NO<sub>x</sub> sorber relative to the at least one other NO<sub>x</sub> sorber not being regenerated and means for feeding to the engine inlet (14) substantially the whole of the effluent of the or each NO<sub>x</sub> sorber being regenerated.

13. An engine according to claim 9, 10, 11 or 12, wherein the or each NO<sub>x</sub> sorber (30) is associated with injector means (32A, 32B) for introducing the agent to gas at the inlet of the or each NO<sub>x</sub> sorber (30A, 30B) during regeneration.

14. An engine according to any of claims 9 to 13, comprising a supply of agent.

15. An engine according to claim 14, wherein the agent is a non-selective reductant such as hydrocarbon (HC), CO or hydrogen.

16. An engine according to claim 15, wherein the agent is engine fuel.

17. An engine according to claim 13, comprising a common-rail fuel injection (12) system with a branch to the or each NO<sub>x</sub> sorber injectors (30A, 30B).

18. An engine according to claim 14, wherein the agent is a nitrogen hydride.

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19. An engine according to any of claims 9 to 18, comprising means, in use, for controlling the intermittent regeneration of at least one NO<sub>x</sub> sorber (30) and the feeding of the effluent of the or each NO<sub>x</sub> sorber regeneration to the engine inlet (14), thereby to reduce the amount of regeneration agent released into the atmosphere relative to a  
10 similar engine lacking the means for feeding NO<sub>x</sub> sorber regeneration effluent to the engine inlet.

20. An engine according to any of claims 9 to 19, wherein the system comprises an oxidation catalyst (22) disposed upstream of the or each NO<sub>x</sub> sorber (30) for catalysing  
15 the oxidation of HC and CO to steam and CO<sub>2</sub> and/or of NO to NO<sub>2</sub>.

21. An engine according to claim 20, wherein the system comprises a particulate matter (PM) filter (24) located between a NO oxidation catalyst (20) and the or each NO<sub>x</sub> sorber (30).

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